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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/518,032	JENNINGS ET AL.	
	Examiner	**Art Unit**	
	LI LIU	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-13 and 15-20* is/are rejected.

7)☒ Claim(s) *2 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The amendments to specification filed on 10/1/2009 have been entered.

Response to Arguments

2. Applicant's arguments field on 10/1/2009 have been considered but are moot in view of the new ground(s) of rejection.

1). Applicant's argument – there is no suggestion in Buser of using a detector that is ever switched off, especially at a time when a signal could be expected to be received. While Buser does use a range gate to eliminate backscatter, this is only useful for excluding any received signal which is outside a time the detector output is considered useful, i.e., ground clutter from targets too close or too far from the target of interest.

Examiner's response – Buser clearly states "[t]he receiver is range gated by the firing logic 10 in synchronism with the triggering of the linearly polarized CO_2 TEA laser 12 to receive and process the train of broadened pulses arriving at 20 nanosecond intervals. Firing logic may range and <u>switch detector 32 off and on</u> at bias circuit 30, or by switching the amplifier 34 for range gating. The target return signals are time modulated by various means into range resolved cross sections to gather target signatures from different zones in the target plane" (column 4 line 16-25). That is, Buser teaches/suggests to use a detector that is switched on/off, or a non-continuous operation detector.

2). Applicant's argument – Boivin relates to chirped pulse wavelength division multiplexing (WDM) used in a communication system. Figure 5 in Boivin shows the transmitter end of a communications link which uses a bank of delay lines to create time division multiplexing. That is, the delay lines deliver signals in different time slots. This is again the opposite of the effect of the delay lines specified in Applicants' independent claims, i.e., it takes signals from different time slots (which may or may not overlap the "limited duty cycle on-time") of the detector and sends them simultaneously, or at least overlapping in time, to the "limited duty cycle on-time" detector.

Examiner's response – First, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "it takes signals from different time slots of the detector and sends them simultaneously, or at least overlapping in time, to the "limited duty cycle on-time" detector) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

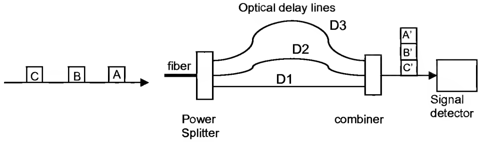
In the amended claim 1, the limitation "a signal can be received by one of said at least two optical paths into the on-time of said signal detector" is recited; but it is not stated that the signals are received simultaneously by a single duty cycle on-time. And in claim 17, the limitation "detecting the portion of the signal that leaves each of said paths during said limited duty cycle on-time", it is commonly known that the duty cycle has the repetitive property, the on-time will repeat one after another according to the

duty cycle; And claim 17 also does not clearly state that the portion of the signal from each of the paths is detected in the same duty cycle on time.

Second, the reference Boivin is cited to indicate that the fiber delay line can be used to delay optical signals. And Misek teaches to take signals from different time slots and sends them simultaneously, or at least overlapping in time, to the detector. That is, the combination of Buser and Misek and Boivin teaches/suggests “it takes signals from different time slots (which may or may not overlap the "limited duty cycle on-time") of the detector and sends them simultaneously, or at least overlapping in time, to the "limited duty cycle on-time" detector” via a fiber optical delay lines.

3). Applicant’s argument – To the extent the Examiner understands that Boivin is somehow putting the time slots back on top of each other, this understanding is believed to be incorrect. The relevant mechanism is described at column 3, lines 4-8 which states "whereby an optical signal having a plurality of wavelength division multiplex channels is generated, split, delayed by a desired amount, modulated and then combined into a single signal such that individual WDM channels are in temporarily [timewise] spaced relation to one another." This is not a statement of combining the WDM channels together into a single time period (i.e., the claimed "limited duty cycle on-time" of the claimed detector), but rather interleaving them into a signal with separated time slots representing the various WDM channels.

Examiner’s response – As discussed above, the reference Boivin is used to indicate that the fiber delay line can be used to delay optical signals. Following figure shows the optical delay line disclosed by Bovin:



The signal A' is a portion of A passing delay line D3, signal B' is a portion of B passing delay line D2, and signal C' is a portion of C passing delay line D1. After the combiner, the signals A', B' and C' can be "at least overlapping in time" and be sent simultaneously a detector. That is, the system disclosed by Boivin can be used to combine the signals of different time slot together into a single time period.

Also, as discussed above, because of the repetition/"cycle" of the duty cycle on-time, the claim language does not positively state that the signals of different time slots are combined into a <u>single</u> time period or single "limited duty cycle on-time" of the detector.

Claim Rejections - 35 USC § 112

3. Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 20, the limitation "an electromagnetic energy <u>transmitter</u>, <u>in which</u> said received signal comprises a reflection of part of the electromagnetic energy by an

object, ... " is cited (page 9, line 7-8). However, according to the original disclosure, the signal detection system, which includes the transmitter and receiver, receives the signals, and the transmitter itself does not receive any "received signal". The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. (Note: based on claim 13, the phase "an electromagnetic energy transmitter, in which said received signal" of claim 20 should be changed to "in the form of an active system including an electromagnetic energy transmitter, in which said received signal", that is the active system receives the signals).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3-11, 13 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buser (US 4,380,391) in view of Misek (US 4,079,246) and Boivin et al (US 6,141,127).

1). With regard to claim 1, Buser discloses a signal detection system (e.g., Figures 1 and 2) comprising:

an electromagnetic signal detector (e.g., the detector 32 in Figures 1 and 2) having a limited duty cycle on-time for detecting receipt of electromagnetic signals (column 4 line 16-25, "[t]he receiver is range gated by the firing logic 10 in synchronism with the triggering of the linearly polarized CO_2 TEA laser 12 to receive and process the train of broadened pulses arriving at 20 nanosecond intervals. Firing logic may range and switch detector 32 off and on at bias circuit 30, or by switching the amplifier 34 for range gating. That is, the detector is switched on and off, and has a limited duty cycle on-time),

at least two optical paths (e.g., Figure 3, the middle column) each arranged to receive an electromagnetic signal from a same nominal direction in space (the direction from the target to the transceiver) and to transmit any received signal towards said signal detector (Figure 3, the single detector element 50).

Buser et al also teaches that the optical paths with different delay (Figure 3, column 4 line 63 to column 5 line 8). But, Buser uses the delay lines for separating signals from different "columnar segmented". And Buser does not expressly disclose: a first optical time delay within one of said optical paths for delaying transmission of said received signal towards said signal detector, wherein said optical time delay is selected to extend the operational range of said signal detector by compressing the real time during which a signal can be received by one of said at least two optical paths into the on-time of said signal detector.

However, Misek teaches a signal detection system comprising an electromagnetic signal detector (e.g., the detector/compensator 22 in Figure 1) for detecting receipt of electromagnetic signals (the signals a-e etc in Figure 1),

at least two paths (the paths d1, d2, … d5, or 1-5, in Figure 2) each arranged to receive an electromagnetic signal from nominal directions in space (Figures 1-4, each path is arranged to receive electromagnetic signals from nominal directions, e.g., a-e or 1 to 5, in space) and to transmit any received signal towards further processing unit/user (Figure 2, the compensated signal 36 is sent out),

a first electrical time delay (one of d1 to d5 in Figure 2; or Delay 1, … Delay 3 etc in Figure 6) within one of said electrical paths for delaying transmission of said received signal towards the further processing unit/user (the delay line d1 and d5 in Figure 2 or Delay 1 ... Delay 3 etc are used to delay respective electrical signals; and the compensated signal 36 is outputted towards the further processing unit/user), wherein said electrical time delay is selected to extend the operational range of said signal detector by compressing the real time during which a signal can be received by one of said at least two paths into on-time of said signal detector (column 3, line 46-66, by using the delay lines, the signals from different field of view can be coherently overlapped at the output 36: "the delay line is set such that a pulse 31 from the first of the detectors overlaps a pulse 32 from the second of the detectors which in turn overlaps a pulse 33 from the third detector etc. The delay line, in effect, acts to coherently sum the pulses. … . The output signal from delay line is available on output line 36 and represents the input signal compensated for the <u>variable path lengths</u>"; the

total amplitude is increased; and compared to the signal 20 without the delay line, the signal 35 is shorter and enhanced by overlapping signals from different paths, or the compensated signal 36 is formed by compressing the real time during which said received signal can be received into the “compressed on-time”; and the receiver/compensator receives signals from optical paths of different lengths, e.g., 1-5 shown in Figures 1-4; the operational range of the signal detector is extended).

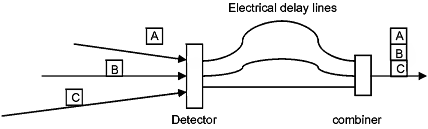


Figure O1

Misek teaches a system and method to coherently add the signals from different optical paths so to enhance the received signal and compensate for the smearing or pulse stretching which occurs due to the scattering of the optical beam; Figure O1 above summarizes Misek’s teaching. But, as shown in Figure 2 or the Figure O1 above, Misek teaches to convert the optical signal into the electrical signal first by the detector, and delay the electrical signals respectively, and then output the coherently added, enhanced electrical signal.

Misek does not expressly teach the optical paths that receive an electromagnetic signal and then transmit the received signal to a signal detector, and an optical time

delay within one of the optical paths to delay the received optical signal and transmit the delayed signal to the detector.

Another prior art, Boivin et al, teaches an system and method to delay optical signals (Figure 5), in which the optical paths (the paths between the power slitter and power combiner in Figure 5) receive an electromagnetic signal from the same nominal direction (determined by the input fiber) then transmit the received signal to a signal detector (the multiplexed chirped signals are transmitted to respective detector), and an optical time delay (the fiber delay lines 504) within one of the optical paths for delaying the received optical signal and transmit the delayed signal to the detector (the delay lines shown as 504 etc are in the paths between the power splitter and power combiner).

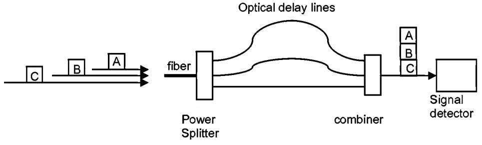


Figure O2

By using the optical delay lines, the optical signals are overlapped first, and then a single detector can be used to detect the enhanced optical signal. That is, the combination of Buser and Misek and Boivin et al teaches/suggests a system as shown in Figure O2 above: the optical paths with the delay lines receive electromagnetic signals from the same nominal direction and then transmit the received signal to a signal detector having a limited duty cycle on-time.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the delay lines as taught by Misek and Boivin et al to the system of Buser so that the optical signals from the same nominal direction in space are delayed by the optical delay lines, and then the signals are overlapped or into the “on-time" of the signal detector, then a single O/E converter can be used to detect the enhanced optical signals, the system reliability is enhanced and cost can be reduced due to the single O/E converter.

2). With regard to claim 3, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And the combination of Buser and Misek and Boivin et al further discloses a further optical path (e.g., Misek: the path 3 or d3 can be viewed as the “further path” or third path, or Boivin: Figure 5, the third optical path between the power splitter and power combiner) is arranged to receive an electromagnetic signal from said same nominal direction in space and to transmit said received signal towards said signal detector (also refer to Figure O1 above), said further optical path including a second optical time delay which is longer than said first optical time delay (e.g., Boivin: the third delay line is shown in two circle that has longer optical time delay than the second delay line that is shown in one circle).

4). With regard to claim 4, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And, the combination of Buser and Misek and Boivin et al further disclose that each of said optical paths is defined by a separate optical fibre (e.g., Figure 5 of Boivin: each of said optical paths is defined by a separate optical fibre. Or Figure 3 of Buser, the separate optical fibers in the spool 52 define

optical path with delay) and the optical fibres are closely packed on a focal plane to collect electromagnetic signals from approximately said same nominal direction in space (Buser: the optical fibres, e.g., 52/58 in Figure 3, are closely packed on a focal plane, e.g., the focus plane of lens 46, to collect electromagnetic signals from approximately the same nominal direction in space).

5). With regard to claim 5, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And the combination of Buser and Misek and Boivin et al further discloses a single optical fibre is positioned to collect electromagnetic signals from said same nominal direction in space (the combination of Buser and Misek teaches to receive optical signal from the same nominal direction in space, and Boivin teaches a single optical fibre is positioned to receive otpical signals and a splitter is connected to the single fiber as shown in Figure 5 of Boivin, or Figure O2 above), and a signal splitter (the power splitter in Figure 5 of Boivin, or Figure O2 above) is arranged to split any collected signal between said optical paths.

6). With regard to claim 6, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And Buser and Misek and Boivin et al further disclose that a lens system is arranged to focus said received signal transmitted by said optical paths onto said signal detector (e.g., Buser: the lens in front of the detector element 50 in Figure 3) is arranged to focus the received signal transmitted by optical paths (e.g., the spool of fibers 52 in Figure 3) onto said signal detector (50 in Figure 3).

7). With regard to claim 7, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And the combination of Buser and Misek and Boivin et al further discloses a signal combiner is arranged to combine said received signals transmitted by said optical paths and to transmit the combined signal to said signal detector (the power combiner 508 in Figure 5 of Boivin, or the combiner in Figure O2 above, combine received signals transmitted by the optical paths and to transmit the combined signal to the signal detector).

8). With regard to claims 8 and 9, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. But, Buser and Misek and Boivin et al do not expressly disclose the detection system includes tagging means arranged to identify which of said optical paths has transmitted a received signal to said signal detector, and the tagging means comprises a tagger arranged in each of said optical paths and arranged to identify a signal transmitted by that optical path.

However, as shown in Figure 5, Boivin et al teaches that each optical path contains a modulator (506 in Figure 5), which modulates and encodes each one of the delayed signals (column 2 line 63-67). Since the modulator encodes each delayed signal and the receiver can extract the modulated information, the modulator can be viewed as the tagging means.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the modulator as the tagger in the system of the combined Buser and Misek and Boivin et al so that the path through which the signal

passes can be labeled in the signal, and the signal associated with specific path can be identified, and the signal processing can be made easier.

9). With regard to claim 10, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And Buser and Misek and Boivin et al further disclose said optical paths includes a processing element (Boivin: Figure 5, the modulator 506 in each optical path) to process a signal transmitted by that path.

10). With regard to claim 11, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And Buser and Misek and Boivin et al further disclose the signal detection system, in the form of an active system (Misek or Buser: a transmitter "actively" sends signal/pulse to the object/target, and the light pulse/signal is scattered from the object/target towards the receiver), in which said optical time delay is selected to define a series of ranges (e.g., Misek: the ranges 1, 2, 3, 4, 5 etc in Figures 2-4) over which said received signal might have travelled to said signal detection system (Misek: the received signal traveled to the detector over the ranges, and equations 8, 9 and Table I show that the time delay is selected to define the series of ranges) and the signal detector is arranged to identify the range of a source of said signal (as shown in Figures 2 and 6, the detector and the delay lines are responsible for individual range of the source of the signal; that is, the ranges 1-6 shown in Figures 2-6 are identified by the detector).

But, Buser and Misek do not expressly state that the signal detector identifies the range of a source of the signal by identifying the optical path through which said signal was transmitted.

However, as shown in Figure 5, Boivin et al teaches that each optical path contains a modulator (506 in Figure 5), which modulates and encodes each one of the delayed signals (column 2 line 63-67). Since the modulator encodes each delayed signal and the receiver can extract the modulated information, the modulator can be viewed as the tagger which put information on the signal in the specific path; and then the signal detector can identify the optical path.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the modulator as the tagger in the system of the combined Buser and Misek and Boivin et al so that the signal detector can identify the range of the source of the signal by identify the specific path, and then the signal processing can be made easier.

12). With regard to claim 13, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And Buser and Misek and Boivin et al further disclose the signal detection system, in the form of an active system including an electromagnetic energy transmitter (e.g., Misek: the transmitter 10 in Figure 1; or Buser: the laser 12 in Figure 2 or the transmitter/receiver 32 in Figure 2), in which said received signal comprises a reflection of part of the electromagnetic energy by an object (Misek: the electromagnetic energy is reflected by object at A, B, ... E etc in Figure 1, or 1, 2, ... 5 in Figure 3 towards the receiver; or Buser: the electromagnetic energy is reflected by the target 50 to the receiver), and said optical time delay is selected to define a series of ranges (e.g., Misek: the ranges 1, 2, 3, 4, 5 etc in Figures 3 and 4) over which said reflection might have travelled to said signal detection system (Misek: the received

signal traveled to the detector over the ranges, and equations 8, 9 and Table I show that the time delay is selected to define the series of ranges), and the signal detector is arranged to identify the range of the object (as shown in Figures 2 and 6, the detector and the delay lines are responsible for individual range, 1, 2, ...5 in Figure 4, of the reflection object; that is, the ranges 1-5 shown in Figures 2-6 are identified by the detector).

But, Buser and Misek do not expressly state that the signal detector identifies the range of the object by identifying the optical path through which said reflection was transmitted.

However, as shown in Figure 5, Boivin et al teaches that each optical path contains a modulator (506 in Figure 5), which modulates and encodes each one of the delayed signals (column 2 line 63-67). Since the modulator encodes each delayed signal and the receiver can extract the modulated information, the modulator can be viewed as the tagger which put information on the signal in the specific path; and then the signal detector can identify the optical path.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the modulator as the tagger in the system of the combined Buser and Misek and Boivin et al so that the signal detector can identify the range of the source of the signal by identify the specific path, and then the signal processing can be made easier.

13). With regard to claim 15, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claims 1 and 13 above. And the combination of Buser and

Misek and Boivin et al further discloses a plurality of signal detection systems arranged as a matrix of optical fibres (e.g., Buser: Figure 3, right column, spools of fibers 54 and detection array 56), each of said optical fibres pointing in a different nominal direction (each detector and spool of fibers is responsive to a particular position in the target plane. Since each particular position has different angle respect to the center of the lens 46, each of the optical fibres points in a different nominal direction) to receive reflections from said object (Buser: the "segmented" target in Figure 3) and said signal detectors are arranged to form an image of said object (Buser: Abstract, the detector array 56 is used for pattern recognition or target identification, that is, the signal detectors form an image of the target, column 4 line 37-43, column 5 line 21-34).

14). With regard to claim 16, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And the combination of Buser and Misek and Boivin et al further discloses a plurality of signal detection systems arranged as a matrix of optical fibres (e.g., Buser: Figure 3, right column, spools of fibers 54 and detection array 56), each of said optical fibres pointing in a different nominal direction (each detector and spool of fibers is responsive to a particular position in the target plane. Since each particular position has different angle respect to the center of the center of the lens 46, each of the optical fibres points in a different nominal direction), to receive reflections (Buser: the "segmented" target reflects the laser beam sent from the transmitter, Figures 1-3), an optical system (the lens 46 in Figure 3 right column) arranged to focus any reflection from the object into the optical paths of said signal detectors, and said signal detectors are arranged to form an image of said object

(Buser: Abstract, the detector array 56 is used for pattern recognition or target identification, column 4 line 37-43, column 5 line 21-34; that is, the signal detectors form an image of the target).

15). With regard to claim 17, Buser discloses a method of detecting an electromagnetic signal (e.g., Figures 1 and 2) travelling from a nominal direction in space (the direction from the target to the transceiver) using an electromagnetic signal detector (e.g., the detector 32 in Figures 1 and 2) having a limited duty cycle on-time for detecting receipt of electromagnetic signals (column 4 line 16-25, "[t]he receiver is range gated by the firing logic 10 in synchronism with the triggering of the linearly polarized CO_2 TEA laser 12 to receive and process the train of broadened pulses arriving at 20 nanosecond intervals. Firing logic may range and <u>switch detector 32 off and on</u> at bias circuit 30, or by switching the amplifier 34 for range gating. That is, the detector is switched on and off, and has a limited duty cycle on-time), said method comprising the step of:

sending the signal into a plurality of paths (e.g., Figure 3, the middle column),

delaying the passage of the separate signal along some of said paths (Figure 3, the middle column), and

receiving the portion of the signal that leaves each of said paths during said limited duty cycle on-time (the portion of the signal is received during the switch on time).

Buser et al also teaches that the optical paths with different delay (Figure 3, column 4 line 63 to column 5 line 8). But, Buser uses the delay lines for separating

signals from different “columnar segmented”. And Buser does not expressly disclose: splitting the signal into portions and transmitting said portions along a plurality of paths, delaying the passage of the split signal along some of said paths, and detecting the portion of the signal that leaves each of said paths during said limited duty cycle on-time.

However, Misek teaches a method of detecting an electromagnetic signal traveling from space (e.g., Figures 1-4), the method comprising

sending the signal into a plurality of paths (Figure 2, the focus lens 24 passes the signal from the field of view 1-5 into a plurality of paths 1-5 or delay line d1 to d5),

delaying the passage of the separate signal along some of said paths (d1 to d5 in Figure 2; or Delay 1, ... Delay 3 etc in Figure 6; the delay line d1 and d5 in Figure 2 or Delay 1 ... Delay 6 in Figure 6 are used to delay respective electrical signals; and the compensated signal 36 is outputted towards the further processing unit/user), and

receiving the portion of the signal that leaves each of said paths during on-time (column 3, line 46-66, by using the delay lines, the signals from different field of view can be coherently overlapped at the output 36: “the delay line is set such that a pulse 31 from the first of the detectors overlaps a pulse 32 from the second of the detectors which in turn overlaps a pulse 33 from the third detector etc. The delay line, in effect, acts to coherently sum the pulses. ... . The output signal from delay line is available on output line 36 and represents the input signal compensated for the variable path lengths”, the result amplitude is increased, and compared to the signal 20 without the delay line, the signal 35 is received into the “compressed” on-time; and the

receiver/compensator receives signals from <u>different length optical paths</u>, e.g., 1-5 shown in Figures 1-4, that is, the portion of the signal that leaves each of said paths at substantially the same time is obtained).

Misek teaches a method to coherently add the signals from different optical paths so to enhance the received signal and compensate for the smearing or pulse stretching which occurs due to the scattering of the optical beam. But, as shown in Figure O1 above, Misek teaches to convert the optical signal into the electrical signal first by the detector, and delay the electrical signals respectively, and then output the coherently added, enhanced electrical signal.

Misek does not expressly disclose: splitting the signal into a plurality of paths, and detecting the portion of the signal that leaves each of said paths.

Another prior art, Boivin et al, teaches a method to delay the optical signals (Figure 5), in which the optical paths (the paths between the power slitter and power combiner in Figure 5) receive an electromagnetic signal from the same nominal direction (determined by the input fiber); and then splitting the signal into portion (the splitter 502 splits the signal into portion) and transmitting said portion along a plurality of paths (the paths with delay lines 504 etc), and an optical time delay (the fiber delay line 504 within each optical path) to delay the passage of the split signal along some of the path, and a power combiner (508 in Figure 5) combines the delayed signal and sends the signal to a receiver/user.

By using the optical delay lines, the optical signals are overlapped after the combiner, and then a single detector can be used to detect the enhanced optical signal.

That is, the combination of Buser and Misek and Boivin et al teaches or suggests a system and method as shown in Figure O2 above: the splitter splits the signal into portions and transmitting said portions along a plurality of paths, the delay lines delays the passage of the split signal along some of the paths, and a detector detects the signal that leaves each of the paths during a limited duty cycle on-time.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the delay lines as taught by Misek and Boivin et al to the system of Buser so that the optical signals from the same nominal direction in space are delayed by the optical delay lines, and then the signals are overlapped at the output of the delay lines or "in a limited duty cycle on-time, then a single O/E converter can be used to detect the enhanced optical signals, the system reliability is enhanced and cost can be reduced due to the single O/E converter.

16). With regard to claim 18, Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 17 above. But, Buser and Misek and Boivin et al do not expressly disclose the method including identifying the path through which the signal was received.

However, as shown in Figure 5, Boivin et al teaches that each optical path contains a modulator (506 in Figure 5), which modulates and encodes each one of the delayed signals (column 2 line 63-67). Since the modulator encodes each delayed signal and the receiver can extract the modulated information, the modulator can be viewed as the tagging means.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the modulator as the tagger in the system and method of the combined Buser and Misek and Boivin et al so that the path through which the signal passes can be identified, and the signal processing can be made easier.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buser and Misek and Boivin et al as applied to claim 1 above, and in further view of Guscott (US 4,339,748) and Halldorsson et al (US 4,674,874).

Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 1 above. And the combination of Buser and Misek and Boivin et al further discloses that the optical time delay is selected to enable the signal detector during a single on-time to coherently add the value of the received signals (Figuer O2 above).

But, Buser and Misek and Boivin et al do not expressly disclose the signal detection system in the form of a passive system in which said optical time delay is selected to enable said signal detector during a single duty cycle on-time to average the value of said received signal.

However, the signal detection system in the form of a passive system is known in the art. Guscott et al discloses a passive detection system (e.g., Figures 1-3 and 10 etc), in which the detector (20 in Figure 3) passively detects the signals from the intruder (the detection system has no any light emitter that sends light to the target, and the detector passively detects the incoming light; that is, the detection system is a "passive" detection system).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply passive detection mechanism as taught by Guscott et al to the system of Buser and Misek and Boivin et al so that the system can directly detects the presence of the target by the light from the target itself, and since no transmitter is needed, the detection system can be simplified.

Another prior art, Halldorsson et al, teaches a signal detection system (Figures 1-3, the system detects the laser radiation), in which the optical time delay (the fibers 14 introduce the optical time delay) is selected to enable the signal detector during an on-time to average the value of the received signal (Figure 3, column 3 line 49-66).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply principle of weighted average as taught by Halldorsson et al to the system of Buser and Misek and Boivin et al and Guscott et al so that the detection system can generate an averaged value of the received signal, and the signal quality can be increased and the signal fluctuation can be reduced.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Buser and Misek and Boivin et al as applied to claim 17 above, and in further view of Halldorsson et al (US 4,674,874).

Buser and Misek and Boivin et al disclose all of the subject matter as applied to claim 17 above. But, Buser and Misek and Boivin et al do not expressly disclose the method including averaging the signal leaving the paths.

However, Halldorsson et al, teaches a signal detection system and method (Figures 1-3, the system detects the laser radiation), in which the weighted average of

the signal leaving the paths is included (the paths or fibers 14 introduce the optical time delay; Figure 3, column 3 line 49-66, the weighted average is used for the signal processing).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply principle of weighted average as taught by Halldorsson et al to the system of Buser and Misek and Boivin et al so that the signal detector can generate an averaged value of the received signal, and the accuracy of measurement and the signal quality can be increased and the signal fluctuation can be reduced.

Allowable Subject Matter

8. Claims 2 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Monday-Friday, 8:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Li Liu/
Examiner, Art Unit 2613
January 14, 2010